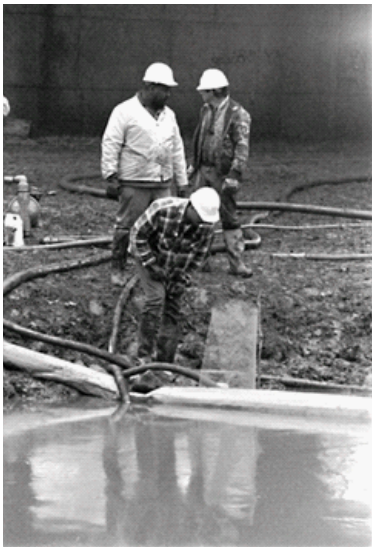
CORRECTIVE ACTION TO CLEAN UP HAZARDOUS WASTE CONTAMINATION

OVERVIEW

Past and present activities at RCRA facilities have sometimes resulted in releases of hazardous waste and hazardous constituents into soil, ground water, surface water, sediments, and air. The Resource Conservation and Recovery Act generally mandates that EPA requires the investigation and cleanup, or remediation, of these hazardous releases at RCRA facilities. This program is known as **corrective action**. Approximately 3,750 sites are undergoing corrective action, three times the number of sites found on the Superfund National Priorities List (NPL) (as discussed in Chapter VI, CERCLA). The degree of investigation and subsequent corrective action necessary to protect human health and the environment varies significantly among these facilities.

The corrective action program is a unique part of RCRA because there are no comprehensive cleanup regulations. Instead, EPA implements corrective action primarily through guidance, and enforces it largely through statutory authorities established by the Hazardous and Solid Waste Amendments (HSWA). Prior to HSWA, EPA's statutory authority to require cleanup of hazardous releases was limited to situations where the contamination presented an "imminent and substantial endangerment to health or the environment." Regulatory authority was limited to releases identified during ground water monitoring at RCRA-regulated land-based hazardous waste units, such as landfills or surface impoundments. Through HSWA, Congress substantially expanded EPA's corrective action authority, allowing the Agency to address any releases of hazardous waste or hazardous constituents to all environmental media at both RCRA permitted and nonpermitted facilities.



Rather than implementing a rigid regulatory framework for corrective action, the Agency developed guidance and policy documents to assist facilities conducting cleanups. EPA developed a set of targeted administrative reforms, known as the RCRA Cleanup Reforms, to achieve faster, more efficient cleanups. The RCRA Cleanup Reforms represent a comprehensive effort to address key impediments to cleanups, maximize program flexibility, and spur progress toward a set of national cleanup goals.

CORRECTIVE ACTION IMPLEMENTATION

One of the keys to understanding the RCRA corrective action program is knowing how a facility becomes subject to corrective action. Facilities generally are brought into the RCRA corrective action process when there is an identified release of hazardous waste or hazardous constituents, or when EPA is considering a facility's RCRA permit application. Additionally, a facility owner or operator may volunteer to perform corrective action by entering an agreement with EPA in order to expedite the process.

■ Permitted Corrective Action

When a facility is seeking a permit, or when a permit is already in place, EPA can incorporate corrective action into the permit requirements. Permitted facilities are required under 40 CFR Part 264, Subpart F, to monitor ground water to detect and correct any releases from regulated land-based hazardous waste land disposal units (LDUs) (as discussed in Chapter III, Regulations Governing Treatment, Storage, and Disposal Facilities). HSWA further expanded EPA's permit authority for corrective action to address all environmental media, as well as releases from areas other than regulated LDUs, such as tanks or containers. Permits issued to RCRA facilities must, at a minimum, contain schedules of compliance to address these releases and include provisions for financial assurance to cover the cost of implementing those cleanup measures. The HSWA statutory provisions for addressing corrective action in permits are as follows:

- Releases from **solid waste management units** (SWMUs) – Under the authority of §3004(u) of the Act, EPA requires corrective action for releases of hazardous waste or hazardous constituents from SWMUs in a facility's permit. A SWMU is any discernible unit where solid or hazardous wastes have been placed at any time, or any area where solid wastes have been routinely and systematically released.
- Releases beyond the facility boundary – §3004(v) of the Act authorizes EPA to impose corrective action requirements for releases that have migrated beyond the facility boundary. This corrective action provision can be complementary to §3004(u), but it is not expressly limited to releases from SWMUs.
- Omnibus permitting authority – This provision, found in §3005(c)(3) of the Act, allows EPA or an authorized state to include any requirements deemed necessary in a permit, including the requirement to perform corrective action. This authority is particularly useful at permitted facilities when there is a release not associated with any particular SWMU. (Omnibus permitting authority is fully discussed in Chapter III, Regulations Governing Treatment, Storage, and Disposal Facilities).

■ Corrective Action Orders

EPA also possesses additional authorities to order corrective action that are not contingent upon a facility's permit. The statutory provisions to issue corrective action orders are:

- Releases at interim status facilities – §3008(h) of the Act authorizes EPA to require corrective action or other necessary measures through an administrative enforcement order or lawsuit, whenever there is or has been a release of hazardous waste or constituents from an interim status RCRA facility (i.e., a facility that has not yet received a RCRA permit).
- Imminent and substantial endangerment – This authority, found in §7003 of the Act, allows EPA, upon evidence of past or present handling of solid or hazardous waste, to require any action necessary when a situation may present

an imminent and substantial endangerment to health or the environment (i.e., poses significant threat or harm). This authority applies to all facilities subject to RCRA, whether or not they have a RCRA permit. EPA can waive other RCRA requirements (e.g., a permit) to expedite the cleanup process under this provision.

■ Voluntary Corrective Action

Corrective action does not need to be initiated subject to permit requirements or an enforcement order. Owners and operators of RCRA-regulated facilities may also volunteer to perform corrective action. There are some activities which may be necessary to achieve corrective action goals at a facility; however, these may require formal approval by EPA or the state. EPA, therefore, encourages owners and operators to work closely with EPA and state agencies to obtain sufficient oversight during voluntary cleanup activities.

IMPROVING CORRECTIVE ACTION

EPA identified several factors that inhibit the efficiency and timeliness of the cleanup program. In some instances, cleanups have suffered from an emphasis on process steps, instead of process goals. Thus, EPA seeks to reduce these hindrances by allowing more flexibility during the cleanup process. EPA has reformed the corrective action program by: addressing specific disincentives through regulatory changes; focusing on near-term goals; and stressing results-based approaches, instead of a process-based scheme.

The Agency finalized provisions to facilitate faster, more efficient cleanups. For example, EPA established alternative soil standards for cleanups (as discussed in Chapter III, Land Disposal Restrictions); harmonized the sometimes duplicative closure and correction action requirements; and increased flexibility for "cleanup only" facilities by developing streamlined RCRA cleanup permits, removing the obligation for facility-wide corrective action, and introducing new units for managing cleanup wastes.

Figure III-17

Potential Disincentives	Special Provisions for Cleanup
Obtaining a traditional RCRA permit for treatment, storage or disposal	Remedial Action Plan (RAP)
LDU minimum technical requirements	Remediation waste management units (i.e., CAMUs, TUs, and staging piles)
LDR treatment standards	Alternative LDR soil treatment standards

■ Special Provisions for Cleanup

Cleaning up RCRA facilities under the corrective action program may involve the management of large amounts of waste such as contaminated soils, water, debris, and sludges which contain a listed waste or exhibit a characteristic of hazardous waste. Such cleanup wastes are referred to as **remediation wastes**. Remediation wastes are generally subject to the same management standards as newly generated RCRA hazardous waste, including treatment, storage, and disposal facility (TSDF) standards, permits, and land disposal restrictions (LDR). These management standards are sometimes counterproductive when applied to cleanups because they may unnecessarily slow the corrective action process and increase the cost of corrective action without providing a concomitant level of protection of human health and the environment. Figure III-17 illustrates potential disincentives to the cleanup program and EPA's remedies.

In order to mitigate the impact of these management standards on the corrective action program, EPA promulgated streamlined regulations that allow the use of alternative remediation waste permit and unit standards. These alternative standards ensure cleanups are fully protective while eliminating some of the regulatory hurdles associated with waste management. For example, the Agency promulgated a modified version of a permit, the Remedial Action Plan (RAP). Unlike the traditional RCRA permit, the RAP is tailored to the needs of a facility that manages remediation waste.

EPA also provided options for increased cleanup

flexibility by establishing three types of remediation waste management units: **temporary units (TUs)**, **corrective action management units (CAMUs),** and **staging piles**.

TUs are tanks or container storage areas that EPA designated to be used solely for the treatment or storage of remediation wastes during cleanups. EPA or authorized states can modify the design, operating, and closure standards that normally apply to these units in order to facilitate prompt cleanup of contaminated waste sites.

A CAMU is an area within a facility that is used only for managing CAMU-eligible wastes for implementing corrective action or cleanup at the facility. A CAMU must be located within the contiguous property under the control of the owner or operator where wastes to be managed in the CAMU originated. By designating an area as a CAMU, EPA exempts that area from LDR and the LDU minimum technological requirements (MTR). However, waste must meet minimum treatment standards for its principal hazardous constituents (PHCs), and CAMUs must meet minimum liner and cap standards similar to the criteria for municipal solid waste landfills (MSWLFs) in Part 258 (See Chapter II).

A staging pile is a unit designated by EPA for the temporary accumulation of solid, non-flowing remediation waste during cleanups. Staging piles do not have to meet MTR, and LDR treatment standards do not apply to the remediation waste managed within these units. Owners and operators may not place any liquids in staging piles and cannot conduct any significant treatment within these units.

■ Environmental Indicators

Although the ultimate goal of the corrective action program is completing final site cleanup, EPA assesses the program using environmental indicators. EPA developed two environmental indicators to focus efforts on early risk reduction, risk communication, and resource protection. EPA uses the environmental indicators to measure progress toward meeting the national cleanup goals established by the Government Performance Results Act of 1993 (GPRA). To meet the GPRA objectives, EPA designated 1,714 RCRA facilities as the cleanup baseline because of the potential for unacceptable exposure to pollutants and/or for ground water contamination. EPA identified many of these facilities using the **National Corrective Action Prioritization System** (NCAPS), a computer-based ranking system that prioritizes the cleanup of the site relative to other sites. The relative ranking (i.e., high, medium, or low) assigned to each site is based on an evaluation of four pathways of actual or potential contamination (i.e., ground water, surface water, air, and soil).

The environmental indicators used are Current Human Exposures Under Control and Migration of Contaminated Groundwater Under Control. The initial goal was that by the year 2005, 95 percent of the baseline facilities have current human exposures under control and 70 percent have migration of contaminated groundwater under control. These environmental indicators will also aid site decision makers by clearly showing where risk reduction is necessary, thereby helping regulators and facility owner and operators reach agreements earlier on which stabilization measures or cleanup remedies must be implemented.

By the deadline of September 30, 2005, EPA had surpassed both goals, reaching 96% and 78%, respectively. The second RCRA cleanup baseline represented an expanded list of 1,968 facilities at which EPA and the authorized States focused their attention from 2006 to 2008. The 2008 goals were to have human exposures controlled at 95% of these facilities, the migration of contaminated groundwater controlled at 81% of these facilities, final remedy decisions made at 36% of these facilities, and final remedies constructed at 27% of these facilities. The Agency surpassed all four goals, reaching 96%, 83%, 43%, and 34% respectively.

The RCRA cleanup baseline has expanded to include all 3,746 facilities expected to need corrective action. Because EPA has set ambitious goals for 2020 that relate to these facilities, the group is called the 2020 Corrective Action Universe. The goals for 2020 apply to the full corrective action universe and are to have human exposures controlled

at 65% of facilities, the migration of contaminated groundwater controlled at 55% of these facilities, and final remedies constructed at 32% of these facilities.

■ RCRA Cleanup Reforms

The goals for the RCRA Corrective Action program remain challenging. To more effectively meet these goals and speed up the pace of cleanups, EPA introduced RCRA Cleanup Reforms in 1999 and additional Reforms in 2001. The 1999 and 2001 Reforms build upon actions taken by EPA and states in recent years to accelerate cleanups. The 1999 Reforms outline policies to remove obstacles to efficient cleanups, maximize program flexibility, and initiate progress toward the GPRA cleanup goals. The RCRA Cleanup Reforms of 2001 highlight those activities that EPA believes would best accelerate program progress and foster creative solutions.

■ RCRA Brownfields Prevention Initiative

A potential RCRA Brownfield facility is a facility that is not in full use, where there is redevelopment potential, and reuse or redevelopment of that site is slowed due to real or perceived concerns about actual or potential contamination, liability, and RCRA requirements. EPA launched the RCRA Brownfields Prevention Initiative with the goal of encouraging the reuse of potential RCRA Brownfields so that the land better serves the needs of the community either through more productive commercial or residential development or as greenspace.

Success stories of RCRA facilities that have been cleaned up and either reused or redeveloped can be found at www.epa.gov/epawaste/hazard/correctiveaction/bfields.htm.

TRADITIONAL CORRECTIVE ACTION COMPONENTS

Corrective action typically includes five elements common to most, though not all, cleanup activities: initial site assessment, site characterization, interim actions, evaluation of remedial alternatives, and implementation of the selected remedy. However, no one approach is likely to be appropriate for all corrective action facilities; therefore, a successful corrective action program must be procedurally flexible. These five elements should be viewed as evaluations necessary to make good cleanup decisions, not prescribed steps along a path. EPA emphasizes that it does not want studies to be undertaken simply for the purpose of completing a perceived step in a perceived process.

■ Initial Site Assessment

The first element in most cleanup programs is an initial site assessment. During the initial site assessment, information is gathered on site conditions, releases, potential releases, and exposure pathways to determine whether a cleanup may be needed and to identify areas of potential concern. In the corrective action program, this step is commonly referred to as RCRA Facility Assessment (RFA). Overseeing agencies may also use initial site assessments to set relative priorities between sites and allocate resources.

■ Site Characterization

Before cleanup decisions can be made, some level of characterization is necessary to ascertain the nature and extent of contamination of a site and to gather information necessary to support selection and implementation of appropriate remedies. This step is often referred to as the RCRA Facility Investigation (RFI). A successful RFI will identify the presence, movement, fate, and risks associated with environmental contamination at a site and will elucidate the chemical and physical properties of the site likely to influence contamination migration and cleanup.

■ Interim Actions

While site characterization is underway or before a final remedy is selected, there is often need for interim actions at a corrective action site. Interim actions are used to control or abate ongoing risks to human health and the environment in advance of the final remedy selection. For example, actual or

potential contamination of drinking water supplies may necessitate an interim action to provide alternative drinking water sources.

■ Evaluation of Remedial Alternatives

Before choosing a cleanup approach, program implementors and facility owners and operators will typically analyze a range of alternatives and evaluate their advantages and disadvantages relative to site-specific conditions. Such a study is typically called the Corrective Action Measures Study (CMS).

■ Remedy Implementation

Remedy implementation typically involves detailed remedy design, remedy construction, remedy operation and maintenance, and remedy completion. In the corrective action program, this step is often referred to as Corrective Measures Implementation (CMI).

SUMMARY

Through a process called corrective action, EPA requires RCRA-regulated facilities to investigate and clean up releases of hazardous waste or constituents to the environment.

Corrective action is included as a requirement in a facility's permit through §3004(u), §3004(v), or §3005(c)(3) statutory authorities. Corrective action can also be made through an enforcement order through §3008(h) or §7003 statutory authorities. Facilities may also voluntarily choose to clean up their contamination.

EPA implements the corrective action program primarily through guidance, and has not promulgated comprehensive cleanup regulations.

Remediation wastes are those managed for the purpose of implementing corrective action, and may include contaminated soils, water, debris and sludges that contain a listed waste or exhibit a characteristic of hazardous waste.

EPA promulgated provisions more appropriate for managing remediation waste, including the streamlined permit, or RAP, and remediation waste management units, including the TU, CAMU, and staging pile.

EPA recently developed a set of targeted administrative reforms, known as the RCRA Cleanup Reforms, to achieve faster, more efficient cleanups. The RCRA Reforms represent a comprehensive effort to address key impediments to cleanups, maximize program flexibility, and spur progress toward a set of ambitious national cleanup goals.

ADDITIONAL RESOURCES

Additional information about corrective action can be found at www.epa.gov/correctiveaction. Further information about other EPA cleanup programs can be found at www.epa.gov/epawaste/hazard/correctiveaction/cleanup.htm.